

# FLIGHT

The  
AIRCRAFT  
ENGINEER  
&  
AIRSHIPS

First Aero Weekly in the World.

Founder and Editor: STANLEY SPOONER

A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport

OFFICIAL ORGAN OF THE ROYAL AERO CLUB OF THE UNITED KINGDOM

No. 728. (No. 49, Vol. XIV.)

DECEMBER 7, 1922

[Weekly, Price 6d.  
Post free, 7d.]

## Flight

The Aircraft Engineer and Airships

Editorial Offices: 36, GREAT QUEEN STREET, KINGSWAY, W.C. 2

Telegrams: Truditur, Westcent, London. Telephone: Gerrard 1828

Annual Subscription Rates, Post Free:

United Kingdom .. 30s. 4d. Abroad .. 33s. 0d.\*

These rates are subject to any alteration found necessary under abnormal conditions and to increases in postage rates

\* European subscriptions must be remitted in British currency

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## DIARY OF FORTHCOMING EVENTS

Club Secretaries and others desirous of announcing the dates of important fixtures are invited to send particulars for inclusion in the following list:

1922.

Dec. 15 .... Lecture, "Experimental Data without Wind Channel," by O. T. Gnosspeilus, before I.Ae.E.

Dec. 15-

Jan. 2 .... Paris Aero Exhibition

1923.

Jan. 3 .... F.A.I. Paris Conference

Jan. 12 .... Lecture, "Seaplane for Commercial Duties," by Maj. D. C. M. Hume, before I.Ae.E.

Jan. 26 .... Lecture, "Wind Tunnel Work at the N.P.L.," by W. L. Cowley, before I.Ae.E.

Feb. 9 .... Lecture, "Seaplane Design," by W. O. Manning, before I.Ae.E.

Feb. 23 .... Lecture, "Aerofoils," by Dr. A. P. Thurston, before I.Ae.E.

Mar. 15 .... Entries close for Dutch Height Indicator Competition.

Apl. 12 .... Lecture, "Some Controversial Points in Aircraft Design," by F. T. Hill, before I.Ae.E.

May 11 .... Lecture, "Experimental Flying," by Maj. M. E. A. Wright, before I.Ae.E.

June .... International Air Congress, London

Dec. 1 .... Entries close for French Aero Engine Competition.

## EDITORIAL COMMENT.



SHOULD the Civil Aviation Subsidy be spent on passenger-carrying machines, or on the air transport of newspapers? This is a question which has been given a good deal of publicity lately, as a result, it appears, of the re-arrangement of the subsidy scheme, by which only one British firm is subsidised on the London-Paris air route. It is argued that statistics show that out of the total number of passengers carried by the British lines three-fourths or so are foreigners, and that therefore the system of paying, out of the taxpayers' pocket, subsidies which are chiefly spent in providing foreigners with "joy-rides," is a sheer waste of money. At present the early morning newspaper service from Lympne to Paris is carried out by a French firm, subsidised by the French Government.

On the face of it, this state of affairs certainly does appear to indicate that there is something radically wrong somewhere. We rather think, however, that the root of the trouble lies deeper, and may have been overlooked by those who are advocating that the subsidy should be devoted to the newspaper service. It is not, to our mind, a question of passenger or newspaper service, but of why London-Paris at all. The real difficulty of the whole position is this—that the London-Paris route is not suitable for an air service established on commercial lines. The route is, as we have repeatedly pointed out in these columns, already so well served by train and boat that aircraft, in order to compete in point of time sufficiently to effect any great saving, must be of fairly fast type. This means high power expenditure per passenger carried, which, with other things, again means uneconomical operation. Add to this the fact that passenger machines have to have large cabins, equipped with comfortable seats, with heating apparatus, with wireless, and with a dozen other things which together form so much dead weight to be carried, detracting from the paying load of the machine.

Thus, without going into great detail, it will easily be realised that fundamentally the passenger machine is considerably handicapped, and that if it is to be

kept operating it is likely to require a subsidy. The French are running passenger services on the London-Paris route, and while they are doing so we must do the same. That we can only do, at the present moment, by some form of subsidy, nor is it likely that it will be possible, within the near future, to operate this route without a subsidy. So far as we can see, the only real reason for maintaining the London-Paris route at all is that the French are running services—subsidised services—over it. It does not appear to be a route leading to anywhere in particular, as far as all-British services are concerned. It was originally to be regarded as a sort of full-scale laboratory in which we could learn a good deal about the running of civilian air lines. But it is extremely doubtful whether the last couple of years have taught us anything that we did not know at the end of 1920, for instance. There is one thing to be said for the new subsidy arrangement: Instead of spending all the subsidy money on the London-Paris route we are now only spending a portion of it, the rest being allocated to the firms operating the London-Cologne and London-Amsterdam (Berlin) lines.

Now for the other side of the picture. A newspaper service is undoubtedly of the very greatest value to the country. But a newspaper air service can, and should, be run with machines totally different from those required for passenger work. There is no elaborate passenger cabin to equip, no seats to run away with paying load, no need for two pilots, possibly no need for wireless equipment, and finally the fuselage of such a machine need not be very large, the newspaper load occupying very small space in proportion to its weight. All this means that a machine specially built for the work would be vastly more economical to run, cheaper in first cost and insurance, and more of a commercial proposition all round than the passenger machine. In fact, it seems to us that, with a properly designed machine it should be possible—assuming that the load of close upon 2,000 lbs. per day could be counted upon—to run a newspaper service without any subsidy, other than that already provided indirectly by the existing ground organisation.

It would, therefore, appear that to take away the subsidy from the passenger line and give it to a newspaper air service on the London-Paris route would not result in a better spending of the taxpayers' money, and that the real solution is to get away, as soon as it is possible, from the London-Paris route altogether, at any rate if there is no prospect of extending it beyond Paris. If it can, some day, be made a stage of a route linking us up with the East, it is altogether a different matter.

#### Rules for Selfridge Gliding Competition

The regulations governing the gliding competition for the 1,000 guinea prize offered by Messrs. Selfridge and Co. have now been published, and will be found elsewhere in this issue. The competition is, it will be remembered, for the first flight in a straight line of a distance of 50 miles. That this feat will be difficult to accomplish goes without saying. But so appeared the *Daily Mail* competition at Itford, and yet the minimum time stipulated was exceeded on the first day of the competition. We should, therefore, hesitate to say that the Selfridge prize will not be won next year,

although it is infinitely more difficult than was the previous competition.

The regulations have been drawn up with the utmost regard for the convenience of competitors, any district in the British Isles being available, the only expenses to which competitors will be put being the entrance fee of £5 and the expenses of the official observers. Even so, in order to reduce expenses, the Royal Aero Club is arranging to appoint official observers resident in the various districts that are likely to be chosen, and except in a very few cases no competitor should, therefore, need to pay any very heavy charges.

We are satisfied that the regulations will be accepted as sensible and fair by all who are contemplating taking part in the competition, and the Gliding Committee of the R.Ae.C. is to be congratulated on the very common-sense spirit in which it has set to work. It will now rest with competitors to show the world that we are not behind in this form of aviation, and certainly nobody could accuse the Royal Aero Club of having placed any avoidable obstacle in their way.

One drawback to a competition of this sort is that the public will not be greatly attracted by the performances. Most of the practice flights, and probably also the majority of the competition flights, will be made without the general public being aware of them until they are over, and even then it is likely that the mere statement that so-and-so has flown 10 miles will not arouse a great deal of general interest. It is possible, however, that if several flights are made within a short period, one slightly longer than the previous one, the interest will be stimulated.

From the point of view of technical interest the competition should be of value in teaching us a very great deal about air currents and how to make use of them, and aerodynamic efficiency will play a far greater part than it did at Itford.

#### FLIGHT Glider Designing Competition

The response to the designing competition instituted by the proprietors of FLIGHT has been very gratifying. A great number of designs have been sent in, and elsewhere in this issue we publish a brief reference to some of the more promising designs submitted. The judging will naturally take considerable time, and it is doubtful whether the announcement of the winners can be made until early in the new year. In the meantime we thank all those who have put so much work into their designs, and assure them that, had conditions justified us, we should have remunerated them on a scale more commensurate with the value of the work. As it is, we would ask competitors to consider themselves rewarded, to some extent, by the fact that they have, with ourselves, helped to make progress in the latest form of flying. We hope to publish several of the designs, in addition to the winning ones, in forthcoming issues of FLIGHT.

#### Prince of Wales—New Appointment

His Majesty the King has been pleased to approve the following appointment:—

His Royal Highness Edward Albert Christian George Andrew Patrick David, Prince of Wales and Duke of Cornwall, K.G., K.T., G.C.S.I., G.C.M.G., G.C.I.E., G.C.V.O., G.B.E., M.C., to be a Group Captain in the Royal Air Force.



# THE "BRISTOL" THREE-SEATER, 100 H.P. BRISTOL LUCIFER ENGINE

## A Machine for the Owner-Pilot

SIMPLICITY of construction and a minimum of parts subject to wear are the special features of the new "Bristol" three-seater biplane which has just been produced by the Bristol Aeroplane Company, Ltd., of Filton, Bristol. In getting out the design of this machine, Mr. Reid, chief designer to the firm, endeavoured constantly to keep in mind the fact that, as the machine was intended for the owner-pilot, it was essential that everything which was likely to require attention should be as simple as possible, and that the number of parts that were at all likely to wear out should be reduced to an

it has been possible to provide direct gravity feed, and all the complications of petrol pumps, cocks and piping have been avoided.

The 100 h.p. "Lucifer" engine is mounted on an engine plate of sheet steel, having four feet which terminate in lugs registering with, and being housed in, corresponding sockets on the front end of the *fuselage longerons*. The hinges are formed on the two port sockets, while locking pins are provided on the starboard side. All that is necessary in order to swing out the engine is to remove the two pins on the starboard



THE "BRISTOL" THREE-SEATER : Front view. The man standing in front gives a good idea of the size of the machine.

absolute minimum. Besides these desiderata, any such machine should, it was thought, be capable of carrying two passengers in addition to the pilot, and should be able to do so with the lowest horse-power consistent with a reasonably good performance. The outcome was the new Bristol three-seater, and in the following notes and illustrations we shall attempt to show the manner in which the designer attacked the problems he had set himself.

### Power Plant

As regards power plant, the Bristol Aeroplane Co. already had available, in the 100 h.p. "Lucifer," an engine which, for its power, probably works with a minimum of parts. With but three sets of valves and plugs to look after, this

side, and the engine with its cowling, etc., is free to pivot on the hinges on the opposite side.

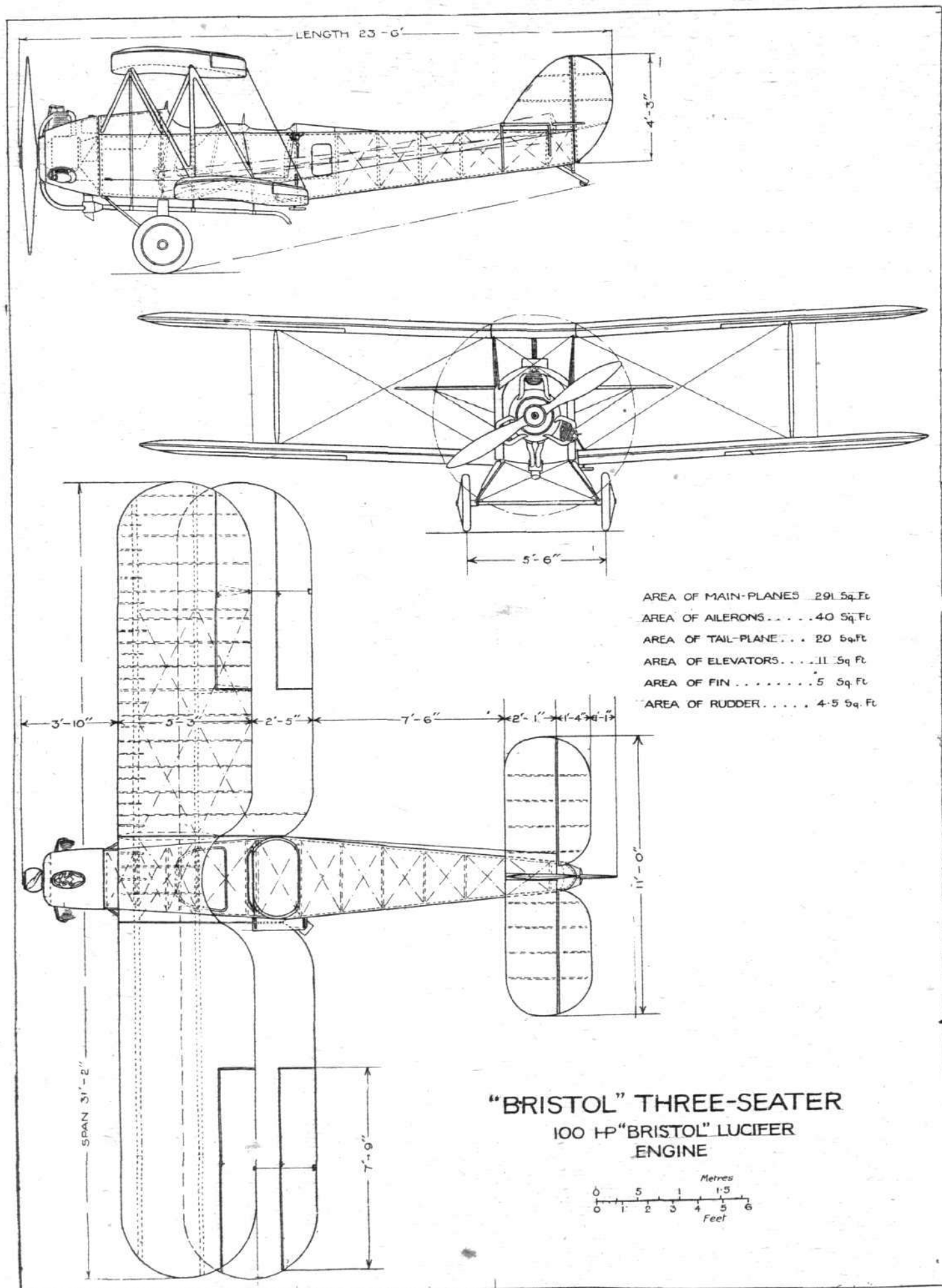
As the petrol and oil pipes are flexible, and are so arranged as to allow the engine to be swung right out without requiring disconnecting, it is possible to get at the back of the engine, with its magnetos, carburettor, etc., without interfering with any adjustments whatever. The engine controls also are so arranged that they are not interfered with in any way by swinging out the engine. One of our photographs shows the engine partly swung out, and it will be seen that the exhaust pipe on the starboard side has a loose-fitting joint in front, the short elbow piece from the exhaust collector moving out with the engine, while the long exhaust pipe itself remains in place on the *fuselage*.



THE "BRISTOL" THREE-SEATER : Three-quarter front view.

engine should require a minimum of attention, and as, furthermore, it is so mounted that it can be swung out, away from the *fuselage* so as to give access to the back of the engine, the work of looking after the power plant should be no more than that of looking after the average motor-car engine. By mounting the petrol tank in the deck fairing of the *fuselage*

The exhaust collector is in the form of a ring, into which the exhaust gases from all three cylinders are carried by two short pipes from each cylinder. This arrangement makes quite a neat job, and has the advantage that the exhaust collector itself forms the front portion of the engine cowling. The oil tank is carried on the fireproof steel bulkhead behind the



THE "BRISTOL" THREE-SEATER : Plan, front and side elevations, to scale.

engine, while the petrol tank is mounted under the deck fairing, behind the fireproof bulkhead, the petrol connections and engine controls passing through fireproof glands.

In the matter of engine controls great attention has also been paid to simplicity. Thus the throttle and spark advance are connected up so that opening the throttle automatically advances the ignition. Similarly, in the case of the petrol and oil cocks, these are operated by the same movement, this arrangement having the advantage that the pilot cannot accidentally start off without turning on the oil.

### General Design

As regards the machine itself, the lines will be clear from the accompanying scale drawings and photographs. It is a heavily-staggered biplane, with only one pair of inter-plane struts on each side. The fuselage is fairly wide in proportion to its depth, and the two passengers are seated side-by-side in a cockpit aft of the pilot's. The latter, owing to the heavy stagger and the small obstruction formed by the "Lucifer" engine, has a particularly good view forward and downwards, while the close proximity of the two cockpits makes it possible for the passengers to carry on conversation with the pilot.

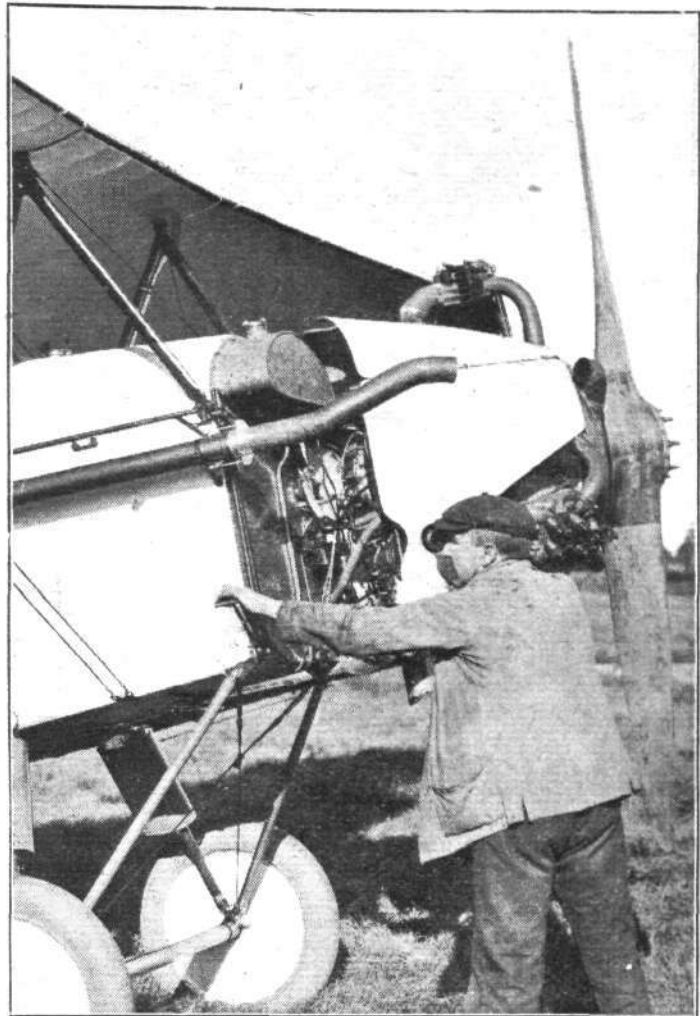
### The Fuselage

Fundamentally the construction of the fuselage is the usual, with four ash longerons, spruce struts, and steel wire bracing. The fuselage fittings are of very simple type, consisting, as shown in one of our sketches, of a simple plate passed outside the longeron, the fitting being located by the eye bolt of the transverse bracing. This eye bolt passes through the longeron from corner to corner, and it might be objected that this weakens the longeron. On the other hand, the plate itself probably reinforces the longeron to a certain extent. A more valid objection to this fitting is, perhaps, that in case of damage to a longeron a new one cannot be fitted without removing all the bracing. In any case, a damaged longeron should not be a frequent occurrence.

In front the fuselage terminates in the steel plate which forms the fireproof bulkhead behind the engine, while at the stern it forms a vertical knife-edge in the usual manner. An interesting feature of the fuselage structure is the door in the port side. The hinges of this door are very substantially made, and the handle which locks the door is of a special type, in which a strong hook is made to engage with a roller in the door frame by the turning of the handle. When the handle is locked in place, by means of a spring-loaded catch, the door forms part of the fuselage structure, and is probably at least as strong as the corresponding panel on the starboard side. Thus easy access to the cockpit is obtained without weakening in the slightest the structure of the fuselage.

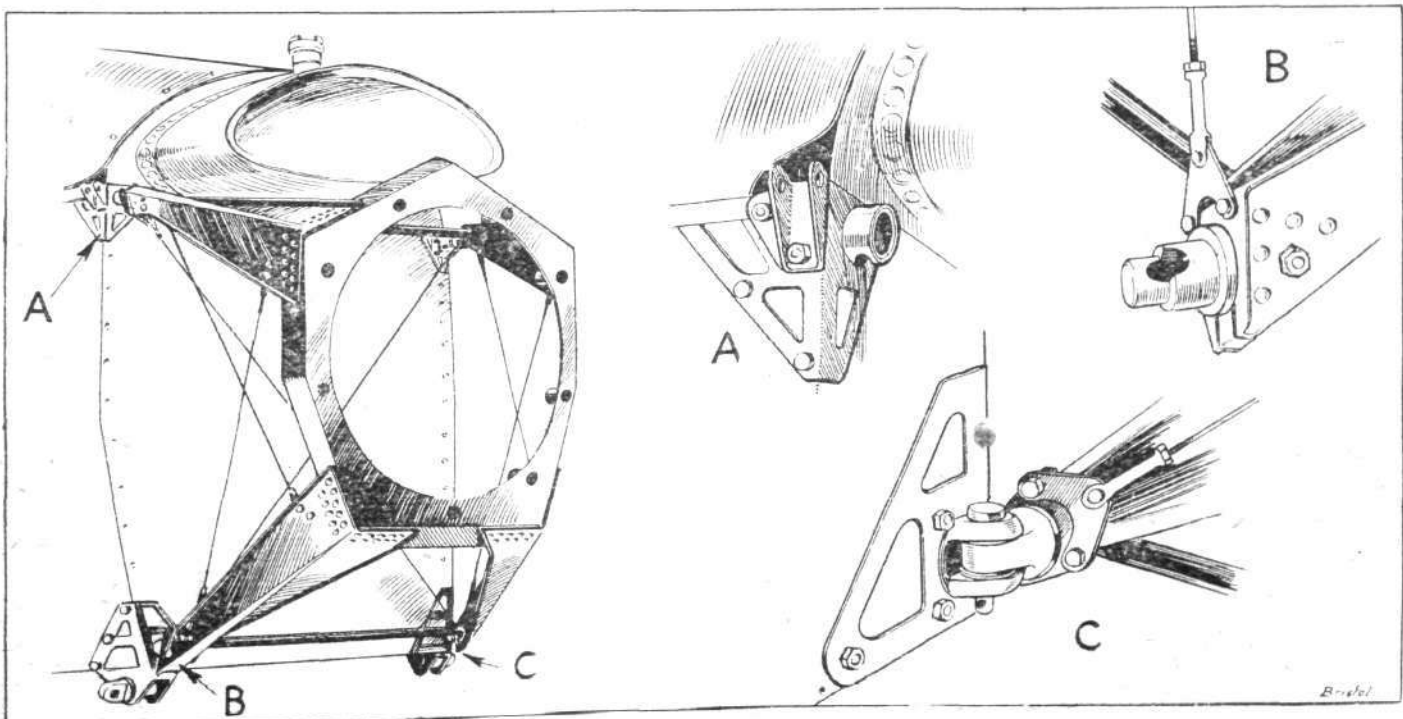
### The Wings

Generally speaking, the wing construction of the "Bristol" is of usual type, with I-section spruce spars and light spruce ribs. Several of the details are, however, of rather novel form. This is the case, for instance, in the arrangement of the aileron controls, and also, to a certain extent, in the



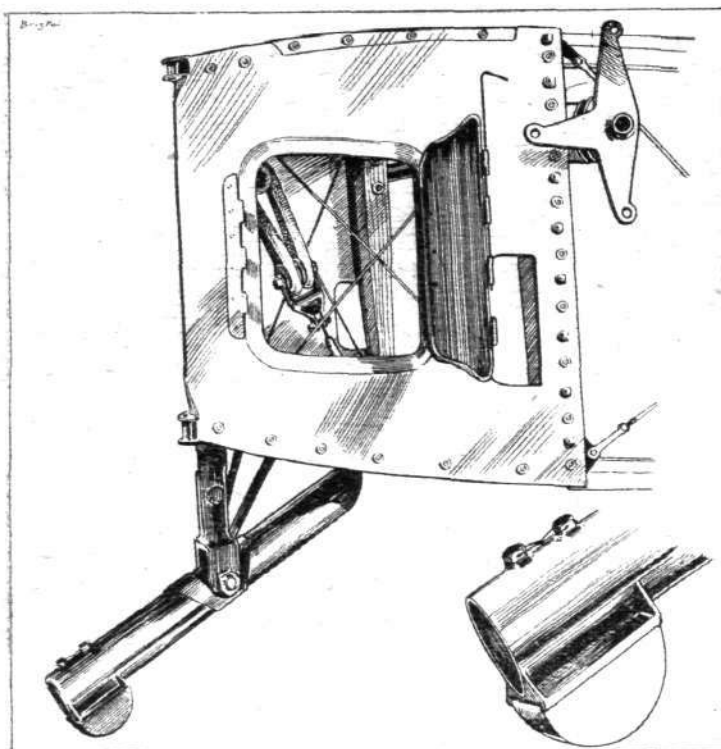
THE "BRISTOL" THREE-SEATER: View showing how engine mounting is swung out to give access to back of engine.

wing fittings, notably the attachment of the top plane end pieces to the top centre-section. In the case of the latter, the fitting is of interest on account of the fact that the pin which joins the wing to the centre-section is placed, not on the neutral axis of the spar, as is usual, but on the top corner of the spar. The object of this arrangement is two-fold. It makes the pins of the upper plane easy to get at in a place where, ordinarily, it is somewhat difficult to insert and remove the pins. Secondly, the off-setting of the hinge should tend to



THE "BRISTOL" THREE-SEATER: Details of the swivel mounting of the 100 h.p. "Bristol" Lucifer engine.





THE "BRISTOL" THREE-SEATER: Details of the tail skid and its mounting. On the right may be seen one of the horizontal "T" cranks of the tail-trimming gear. Inset shows the renewable shoe of the tail skid.

reduce the bending moment, owing to the compression in the top spar acting below the pin, and thus creating an opposite bending moment to that resulting from the loading of the spar as a beam. On the other hand, the compression has to be taken by the pins in shear, as the spar roots do not touch the ends of the centre-section spars. As, however, the pins are of fairly large diameter they are probably easily capable of withstanding the shear loads.

#### The Wing Bracing

The biplane wing structure is braced with Rafwire in duplicate, and the bracing is somewhat unusual in that there is but one set of duplicate anti-lift wires on each side. As the stagger is very considerable, the rear spar of the upper wing is vertically above the front spar of the lower wing, and it is in this plane that the anti-lift wires are running, from the rear spar of the top centre-section to the attachment of the front inter-plane strut to the lower wing. Thus there is no anti-lift wire running to the point where the rear inter-plane strut meets the lower rear spar.

The struts, inter-plane as well as centre-section, are streamline steel tubes, welded together to form a letter N. Each set of struts thus forms a unit, and there is consequently no incidence bracing requiring adjustment. The struts are attached to the spar fittings by longitudinal bolts.

#### The Tail

In shape the various tail surfaces are of usual type, the tail plane and elevators being built of steel tubes. As the weight of the passengers carried may vary considerably, the tail plane is of the trimming type, the details of which will be referred to later. The vertical fin is approximately a quadrant, to which the lobe-shaped rudder is hinged. It is of interest to note that all control cables to the tail run either through the fuselage, under the passengers' cockpit, or along the outside on the starboard side, so as to avoid getting in the way of the passengers' door. The elevator tube runs right across, and there is only one pair of cranks, placed on the starboard side.

#### The Controls

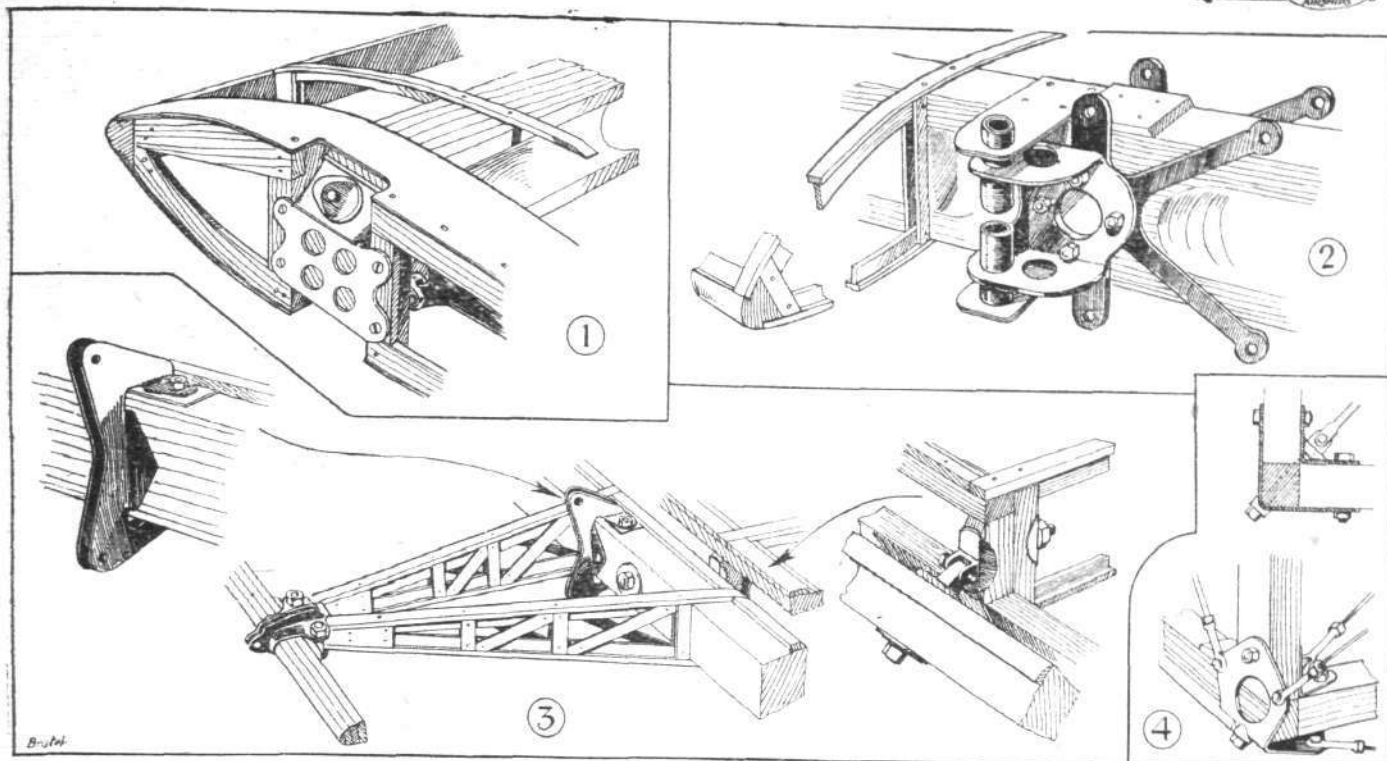
Reference has already been made to the somewhat unusual arrangement of the aileron controls. The departure from usual practice is chiefly one of using crank levers in place of pulleys. Thus from the control stick in the pilot's cockpit cables run to cranks in the lower wing. These cranks are housed in the leading edge, and as a matter of fact both the direct cable on the lower plane and the return cable on the top plane run along the outside of the leading edge, where they can be inspected along their whole length, while, owing to the fact that they lie close to the leading edge, they offer no extra resistance. On the same spindle, but just below the bottom plane, is another crank, at right angles to the one housed in the wing, and pointing outward. From the latter crank a cable runs to the aileron crank, which is simply a piece of sheet steel, 10 gauge or so. A wire runs from the trailing edge of the lower aileron to the trailing edge of the top aileron, while from the crank of the latter (which is, of course, placed above the aileron) a cable runs to a transverse crank secured to the same spindle as the longitudinal crank in the leading edge. From the latter crank the return cable runs straight across to the crank on the opposite side, following the leading edge.

The control column itself is a tube, terminating at the top in a handle shaped somewhat like an inverted V, not unlike those used on a number of German machines during the War. The control tube is hinged to a rocking shaft running across the floor of the fuselage. Thus the "stick" can be swung from side to side for aileron control (and owing to the width of the fuselage the amount of movement available is considerable), while a to-and-fro movement rocks the transverse shaft. The latter carries on one end, and mounted on the starboard side of the fuselage, a crank, from which a cable runs to the elevator. Concentric with and mounted on the same transverse tube as the elevator control crank is the crank for the tail trimming gear. This crank is operated by a lever on the right-hand side inside the pilot's cockpit. This lever works on a notched quadrant, and as there are six notches six tail plane positions are available. As the range of the tail plane setting is about 5 degrees, each notch corresponds approximately to one degree change in the incidence of the tail plane.

At the stern the tail trimming control cables are attached to horizontal T-cranks, the single limb of which is attached to a short tubular strut running to the trailing edge tube of the tail plane. Thus when the T-cranks are rocked the trailing edge of the tail plane is raised or lowered. This arrangement is not, perhaps, quite so refined an engineering job as is the usual worm gear, but it is more rapid in action, and for a small machine with a relatively low-power engine it is probably



THE "BRISTOL" THREE-SEATER: Three-quarter rear view.



THE "BRISTOL" THREE-SEATER : Some constructional details. 1, Spar fitting on top plane. The eye bolt engages with a forked end on the centre-section spar. 2, The bracket and bearings, on the front spar, for the cranks which are used instead of pulleys. 3, Details of aileron construction and fittings. Inset : Aileron hinge. 4, A typical fuselage fitting.

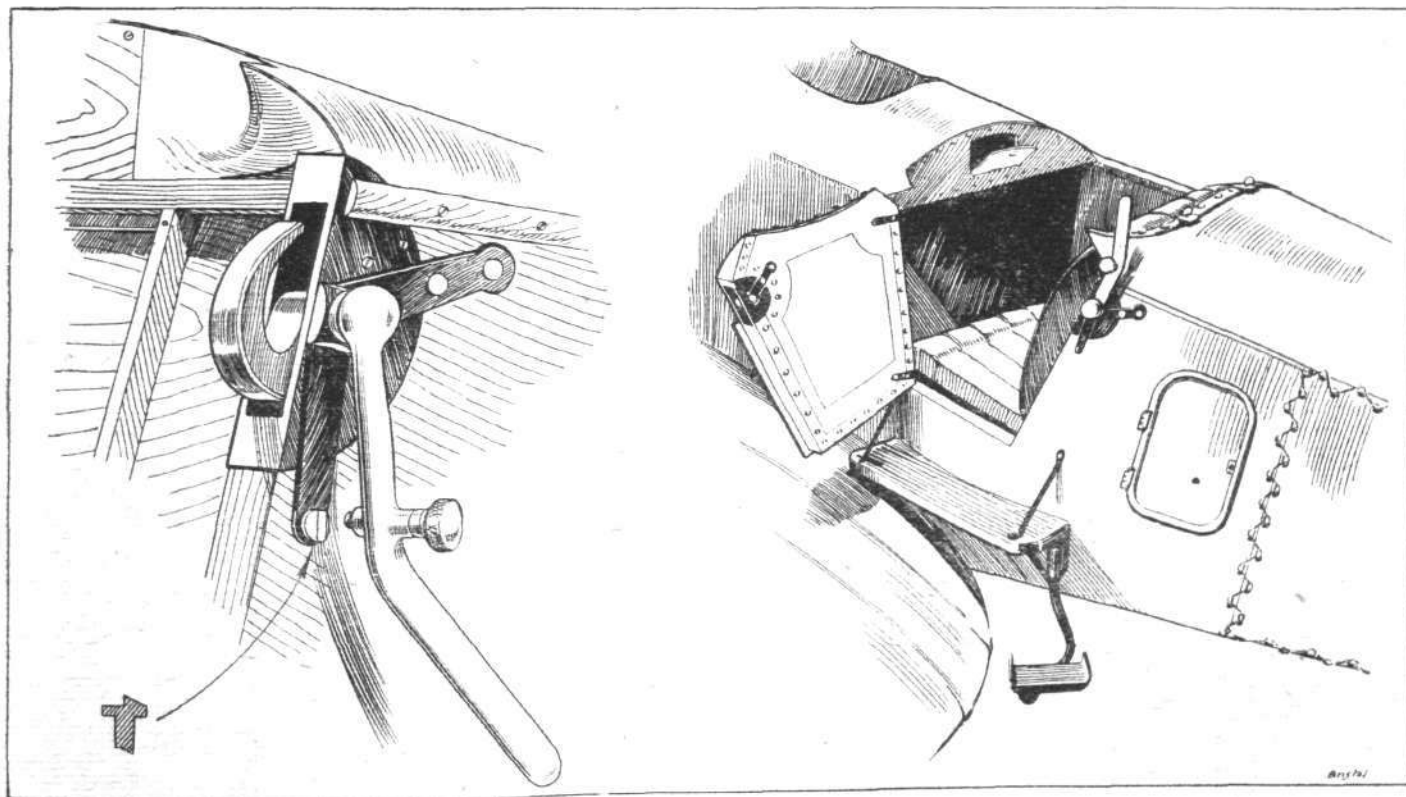
quite satisfactory. The outer ends of the rear tube of the tail plane are braced by sloping struts (streamline steel tubes). At the inner end these struts are attached to a short vertical tube inside the fuselage. This tube is attached to the centre of the tubular rear spar, and a small horizontal V keeps it in a vertical position. The front spar is braced to the lower longerons by sloping struts, and no special provision is made in the strut attachments for allowing the tail plane to trim, other than that provided by the slight amount of "play" in the strut fittings, this having been found to be sufficient.

#### The Cockpits

As already mentioned, the pilot's cockpit is in front, immediately behind the fireproof bulkhead. The view, both when flying and in landing, is excellent. The tail trimming gear already described enables the machine to be flown either

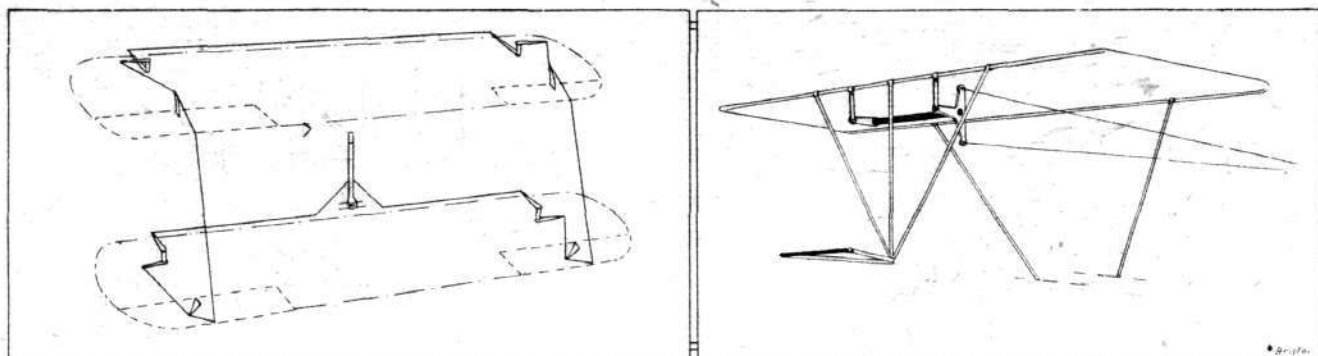
solo, or with one or two passengers. The instrument-board in front of the pilot carries revs. indicator, altimeter, air speed indicator, compass, clock, and oil-pressure gauge. The pilot's cockpit is reached by stepping from the passengers' cockpit, over the narrow coaming. A convenient grip is provided in the top centre-section in the form of a small semi-circle cut out just in front of the rear spar. Thus by grasping the spar the pilot can steady himself in getting in or out of his cockpit.

The passengers' cockpit is fairly wide, and there is room for two to sit comfortably side-by-side. At the time we inspected the machine recently, no wind screen had been mounted in front of this cockpit, but it is intended to fit a special form of screen so as to protect the passengers. We understand that, if desired, it is possible to fit a detachable cabin top over this cockpit, thus turning it into an enclosed



THE "BRISTOL" THREE-SEATER : The handle of the door giving access to the passengers' cockpit is so designed as to make, when locked, the door a load-resisting part of the fuselage structure.





**THE "BRISTOL" THREE-SEATER :** On the left, a diagrammatic representation of the aileron controls, in which use is made of cranks in place of pulleys. On the right, a diagram of the tail-trimming gear. The tail plane is hinged on its leading edge, and the trailing edge is moved up and down by horizontal "T" cranks and short struts.

cabin. Mention has already been made of the fact that access to the cockpit is by a door on the port side. Two steps are provided so that the passengers can step into the cockpit as easily as into a motor-car, and yet when the special locking arrangement is operated the door is securely fastened and forms part of the fuselage structure. From the passengers' cockpit also the view is very good, although the lower plane does obstruct it to a certain extent.

Just behind the passengers' cockpit is a luggage compartment, reached through a separate door on the port side. This compartment will hold a couple of suit cases or similar articles, so that the air travellers can carry with them sufficient personal luggage on their tours.

#### The Undercarriage

A simple V undercarriage of the oleo type is fitted on the new Bristol three-seater. The front legs of the V act as radius rods, while the rear legs are telescopic and incorporate the oleo gear, which consists of a plunger piston through which passes a tapered needle valve, whose function it is to maintain the oil pressure constant throughout the stroke of

the plunger. In addition to the oleo gear, there is a stout steel coil spring which takes the place of the usual rubber shock absorbers. Thus the pilot is relieved of any worry as to whether his rubber rings have perished. The function of the coil springs is chiefly to carry the relatively light loads of taxiing. The heavier loads of a landing are taken also by the oleo gear.

#### Specification

The main characteristics of the Bristol three-seater are as follows: Length over all, 23 ft. 6 ins.; span, 31 ft.; height, 8 ft. 10 ins.; wing area, 291 sq. ft.; weight, empty, 1,210 lbs.; petrol (25 galls.) and oil (3 galls.), 215 lbs.; pilot, 180 lbs.; two passengers, 320 lbs.; luggage, 75 lbs.; total loaded weight, 2,000 lbs.; power loading, 20 lbs./h.p.; wing loading, 7 lbs./sq. ft.; speed at ground level with full load, 90 m.p.h. (without passengers and luggage 93 m.p.h.); speed at 5,000 ft., with full load, 88 m.p.h. (without passengers and luggage, 91 m.p.h.); climb to 1,000 ft. with full load, 2 minutes; cruising speed, about 75 to 80 m.p.h.; landing speed, about 40 m.p.h.

## LONDON TERMINAL AERODROME

Monday evening, December 4, 1922.

In spite of the fact that for about eight days in November the fog on the various air routes was so bad that all flying was cancelled, the past month has proved a record for passengers carried in November. As usual, Handley Page Transport head the list, having carried 257 passengers between London and Paris during the month, and this even with many services cancelled owing to inclement weather. The Daimler Airway have had no fewer than 134 passengers on their inland air-line between London and Manchester, and, in conjunction with the K.L.M., have carried 99 passengers between London and Amsterdam; while the Instone Air Line have had something like 90 passengers on their London-Cologne line.

The French Air Lines, although they do not figure to any great extent in the passenger lists, have carried large quantities of freight between London and Paris, it being the rule, rather than the exception, for the Farman Goliaths to have practically full loads of parcels. The K.L.M., of course, continue to fill their outward-bound machines with goods. In fact, Capt. Leverton has, on many occasions, been unable to accommodate passengers owing to the fact that the regular consignments of goods occupied his entire space.

#### The Winter Newspaper Service

The C.M.A. newspaper service from Lympe to Paris, with a return load of fruit and vegetables, is working admirably. The newspapers get to Paris shortly after 10 a.m., even on these dark mornings, and this means that they are in south of France resorts much earlier than would be the case if they had to go by boat-and-train.

The Instone Air Line converted one of their D.H.18's into an "aerial pantechicon" the other day in order to carry the personal effects of the entire family of a British officer to Cologne. In the first consignment was a baby's cot, which travelled over the same days as its owner. In fact, although the goods-machine started after the passenger plane, it arrived first at Cologne, owing to the fact that it made a non-stop flight, while the passenger machine put down at Tirlmont for petrol.

The Duke of Sutherland, Under-Secretary of State for

Air, visited the aerodrome during the week, and, after taking a good look round, went for a short flight in the Napier-Bristol ten-seater, which is owned by the Department of Civil Aviation.

#### Improving the Aerodrome Roads

The Ministry of Transport roads-section has been busy making some much-needed improvements to the aerodrome roads. In several places the main-road through the aerodrome has been widened a few feet by taking away the mud at the side and transforming it into firm, hard road. There is, however, a lot to be done to both the aerodrome roads, and the most-used parts of the aerodrome itself, before they are in the state befitting London's air-station. It seems that either there is no one at the Air Ministry clever enough to devise some means of eliminating mud on aerodromes, or else there is a shortage of money to carry any scheme proposed into effect.

During the week there have been some strong north-westerly winds, which have lengthened to some extent the flights to Manchester, but, at the same time, have correspondingly shortened the return flights. One day this week a north-bound Daimler overtook a train, and then, apparently getting into an extra strong wind-current, was unable for ten minutes to gain on the train in any way. The air-speed-indicator showed a speed of 105 miles an hour, but still the aeroplane could not beat the train. Finally the pilot swerved away and lost sight of the train, arriving in Manchester 2 hours 50 minutes after leaving Croydon, instead of the usual 2 hours.

The Surrey Flying Services have made one or two joy-ride flights during the week, but winter appears to put an effectual "stopper" on joy-riding. In the meantime the staff of the Surrey Flying Services are very busy erecting new Avros and D.H.9's for the coming season.

The British Petroleum Company have now got their own representative on the aerodrome, and he tells me that they are to have an office alongside that of the Anglo-American Company. The B.P. Company have erected a special filling station outside the Handley Page shed, in order to fill these machines before they are brought round to the departure platform.



# GLIDING, SOARING AND AIR-SAILING

*Those wishing to get in touch with others interested in matters relating to gliding and the construction of gliders are invited to write to the Editor of FLIGHT, who will be pleased to publish such communications on this page, in order to bring together those who would like to co-operate, either in forming gliding clubs or in private collaboration.*

THE regulations for the Selfridge 50-mile Gliding Competition for a prize of 1,000 guineas have now been published, and will be found on another page of this issue of FLIGHT. We think it will be agreed that the Royal Aero Club has tried to facilitate matters as much as possible for competitors by ruling that the flights for the prize may be made anywhere in the British Isles. Thus competitors will not have to make the attempts over unfamiliar country, but may make them under conditions with which they are well acquainted. This should be a great help to competitors in various ways. For instance, it will be possible for a competitor to practise over ground near his home, and when he feels that he has attained some measure of proficiency he can make his competition flight over the same country, instead of having to start all over again by going to some other, and unfamiliar, locality.

ANOTHER advantage is that he will be able to live at home and will not be incurring large expenses for housing, etc., while he is practising, while his machine should not have to be sent half-way across the country by rail, as might have been the case had the Royal Aero Club decided upon one particular locality. Furthermore, the expense of having attempts officially observed (which has to be borne by competitors) should be considerably reduced by the appointment of observers resident in or near the various localities selected.

COMPETITORS must send in, at least seven clear days before their first attempt, a map on which is marked the approximate starting-point selected, and the course which it is intended to follow. At the expiration of the first seven days no further notice is required, but the official observer must, of course, be notified in time for him to be present at each start. Should a competitor decide, after a first attempt, that a different locality might be better suited to his requirements he must, presumably, again notify the Club, sending in particulars as before.

THE Royal Aero Club will issue special log sheets, which must be carried by the pilot on all flights in the competition. On the starting certificate of this log sheet the official observer will enter such particulars as will enable the Club to locate the exact point of starting. At the completion of a flight a pilot must enter on the landing certificate such particulars as will enable the Club to locate the exact point of landing, and the pilot must get this certificate signed by two persons, who should, if possible, be present at the landing. Failing that the pilot must obtain the signatures of two persons resident in the district in which the landing was made.

IT will thus be seen that the rules for the British competition are generally similar to those in force in Germany for the *Berliner Tageblatt* prize, with the exception that the solemnity of oaths is dispensed with. Yet we have not the slightest doubt that the British declarations will be every bit as true and accurate as the German.

ALL enquiries regarding the competition should be sent to the Secretary of the Royal Aero Club of the United Kingdom, 3, Clifford Street, London, W. 1, from whom also entry forms may be obtained, and to whom the entry fee of £5 should be sent. The special log sheets will be sent to entrants upon receipt of the entry fee.

A CORRESPONDENT writes to tell us that he has lately completed a glider, but complains that he has, up to the present, had very poor results. He states that his machine is a monoplane composed of a BE fuselage, cut down considerably, and of a pair of Sopwith wings, and that when he tested the machine by towing it behind a car it only got up to a height of about 6 ft., dropping almost instantly as soon as released.

WE do not know what is the weight of the machine referred to by our correspondent, and the description "Sopwith

wings" is rather vague. If, however, they are the top plane of a Sopwith "Camel" we do not wonder at the poor results, as the area would, in all probability, be much too small, giving too high a wing loading. The average wing loading of the machines at Itford was 2 lbs./sq. ft. The "Brokker" was probably loaded considerably higher than this figure, but then it had a very high-lift wing, which would help materially. Also on the day the "Brokker" made its famous flight a very strong wind was blowing, and it is quite possible that this machine would not have got off particularly well if towed behind a car in still air.

*A propos* the "Brokker," we learn that Sqdn. Ldr. Gray has taken the machine to Salisbury Plain, where he thinks he will be able to make quite good glides, there being a number of hills which are considered nearly if not quite as suitable as those at Itford. It is reported that Sqdn. Ldr. Gray is to carry out tests for the Air Ministry in order to ascertain whether or not gliding is likely to prove of value in the training of pilots. Personally we think that it may prove very valuable indeed, offering as it does opportunities of getting pupils used to being in the air and to handle the controls. Probably at first two-seater instruction machines might be used, to be followed later by work on single-seaters, much after the fashion of training on power-driven machines. Tuition on gliders should be very cheap, as there are no expensive engines and no petrol to buy. It is to be hoped that Sqdn. Ldr. Gray will succeed in convincing the Air Ministry of the value of gliding.

IN the meantime the R.A.F. is taking up gliding unofficially already. Thus on a recent visit to Andover, we learned that a gliding club had been formed at the R.A.F. Staff College and Headquarters of No. 7 Group, and that already the club counted 150 members. Gordon England's little monoplane has been acquired, and has been repaired after the smash, in which, incidentally, it was but very little damaged, most of the breakages occurring in getting Gordon England out of the machine. Later on it is intended to build gliders at Andover out of scrap material left over from wrecked aeroplanes. Thus not only will the gliding club be able to get its machines cheaply, but the members will be able to learn a good deal about construction. We trust that a great many other stations will follow this example, and shall be very glad to hear from such gliding clubs, Service no less than civilian.

HIS many friends will be pleased to hear that Gordon England is rapidly recovering from the effects of his crash on Firle. He is already out, and is able to get about on crutches, although he has not yet quite got used to his new "controls" and "undercarriage."

FROM Mr. L. F. Leeming, of Hale, Cheshire, we have received the following letter:—

"A note in your 'Gliding Notes' recently on a German pilot who flew for some way on the flat using no hill, reminds me of some early experiments made in 1911. The glider was a crude affair, a monoplane with a 20-ft. span and a chord of 5 ft. The pilot stood between the main planes, carrying the whole machine by two straps fastened to the two out-riggers, which carried the tail. As in most of the early machines, the only control was by moving the weight of the pilot's body.

"The attempts were made on the flat sands at Southport, Lancs, and after several hours' practice spread over several days, a friend of mine became so expert with this little glider that he could almost make it do anything. In a wind of about 15-25 m.p.h., soaring and glides of two minutes duration were obtained. Our method of taking off was as follows: The pilot stood facing the wind in the machine, and at each wing-tip an assistant stood holding a 20-ft. rope attached to the wing. The assistants then went briskly forward into the wind, pulling on the rope, and the pilot worked the glider off into the air. He soared and rose until the ropes were almost vertical when the assistants cast off, and the pilot then glided down, prolonging the glide as long as possible by soaring. Although not expert myself, and unable to get good glides, my friend could do wonderful things, and made flights of quite big distances. We had the glider for some weeks—it was kept in the open—but eventually I tried it one day in too strong a wind, and being unable to keep it head on (we had no rudder or fin) the machine tipped up, a wing-tip struck the ground, and the whole machine spun round violently, pitching the pilot out at a great speed. The pilot was in bed for some days, and the glider was a total wreck.

"I sometimes wonder what the pilots of today would think of our early machines of those days. On the monoplane mentioned above the covering was single-surfaced with that yellow paper at that time quite common—I remember A. V. Roe's triplane at Blackpool Meeting was covered with this stuff—in fact, I bought the paper from Messrs. Roe, then at Bromsfield Mills. The wood used was ordinary timber purchased from a builder, and was full of knots; one of the outriggers was even made out of a clothes-prop! To get a camber on the planes we cut notches in the two main spars, and bent canes in between these, the canes just too long to fit

curving upwards and making the camber. Another weak point was the glue, which proved too weak, and so pieces of the covering were always coming off in the air. When it is thought that we risked our lives in a thing like that don't we seem optimists?

"I am at work at present on a modern glider, my fourth, and intend to make a really sound job of this. When it is finished I propose to make all the first trials on the flat, as I am convinced that by soaring, and later after more experience perhaps by 'gust-flying,' it is possible to obtain long flights with duration of several minutes."

## OUR GLIDER DESIGNING COMPETITION

### Many Designs Entered

THE Designing Competition for a Prize of £25 and Consolation Prize of £10, offered by the proprietors of FLIGHT is now closed, and we are extremely pleased to be able to announce this week that the response has been most gratifying. A very great number of designs have been submitted, and although a cursory examination has shown that out of these a number do not in the slightest conform to the regulations laid down, there still remain a very fair number which appear to show very serious application to the problems involved, and which will have to be seriously considered by the judges.

As we know that our readers are very interested in this competition, we publish below a very brief indication of the nature of some of the more promising of the designs, although by doing so we do not in any way prejudice the judging of these or other designs. The final judging will take up a considerable amount of time, and will involve a great deal of work, and as Mr. Fairey and Mr. Handley Page are both busy men, it will, we are afraid, be some little time before the announcement of the awards can be made. We can assure competitors that the results will be published as soon as ever possible, but the checking of stress calculations, etc., will necessarily take time, and it is the intention of the judges to go into the designs very thoroughly so as to ensure as far as possible that all features of each design are taken into consideration before passing final judgment. We hope, however, that it will be possible to announce the results early in the New Year. What with the Paris Aero Show and other pressing matters, we doubt if publication of the winning design can be started earlier than that.

"K<sub>L</sub>" is a biplane with enclosed fuselage and monoplane tail. There is a slight backward stagger, caused by placing the inter-plane struts at right angles to the chord line. Thus the angle of incidence causes the wings to have a slight backward stagger. This machine has a wheel undercarriage, with the wheels partly enclosed in the fuselage, only a portion of them projecting through the floor. Wing-tip skids are fitted on the lower plane. Differential controls, of the Peyret type, are incorporated in the design.

"Turkey Buzzard" is a semi-cantilever parasol monoplane with tapered wings and enclosed streamline fuselage. The undercarriage is unusual in that it consists of a transverse member projecting from the bottom of the fuselage, and carrying at each end a crank which, on striking the ground, moves back and up against a spring.

"FLIGHT" is a biplane with a gap/chord ratio of approximately 1.5 and a circular section fuselage.

"Orton" has sent in a design for a cantilever parasol

monoplane somewhat similar to the German monoplanes, and in some respects, notably as regards shape of body, resembling the Hannover "Vampyr." The wing section used is the Glenn Martin No. 2.

"In Nubibus" is a braced monoplane with tapered wings and large balanced ailerons. It has a wheel undercarriage with single struts sloping up to the sides of the body. The wings are intended to pack flat against the sides of the fuselage for transport.

"Norbet" is a pure cantilever monoplane, with no supports outside the fuselage and straight-taper wings. In side view the machine is a good deal like a Darmstadt, but a wheel undercarriage is fitted. The wing section is airscrew 4.

"Aero" is a braced monoplane, with enclosed fuselage and a biplane tail not unlike that of the Vickers machines. There are two rudders, with a balance working in cut-out portions of the fixed fins, and an extra single fin is placed above the top plane of the biplane tail. The undercarriage is of the skid type, with hoops running over the nose of the fuselage.

One competitor has submitted two designs, called by him "Elisabeth Sesqui" and "Lizzie Twintail" respectively. In addition to drawings of the two machines, this competitor also sends scale models, but whether or not these would be sufficiently accurate for wind tunnel work may be open to doubt. Also their strength might be insufficient, as the forces on a model in the wind channel may be considerable. "Elisabeth Sesqui," as the name implies, is a "sesquiplan," with main wings bent at a considerable angle in front view, the wing roots sloping up from the lower corners of the fuselage at a steep angle (somewhat after the fashion of an L. Clement monoplane exhibited at a Paris Aero Show), meeting the horizontal portion of the wing nearly half-way out to the tip. The outer ends of the dihedral portions of the wing are joined by a large spar enclosed in a wing-section casing so as to give a certain amount of lift in return for its resistance.

"Lizzie Twintail" is a biplane, with the lower plane placed at such a large dihedral angle that its tips all but meet those of the top plane. As the name suggests, there are two fins and two rudders. The fuselage, which is fairly wide, has the form of a wing section in side view, evidently with a view to making it lift a certain amount, although as the aspect ratio is less than unity the efficiency might not be very good (on the fuselage only, of course). A similar idea was used in a large American passenger machine, the Remington-Burnelli, and we believe that fairly good results were obtained.

## THE SELFRIDGE 50-MILE GLIDING COMPETITION

(Under the Competition Rules of the Royal Aero Club.)

Prize of One Thousand Guineas offered by Messrs. Selfridge and Co., Ltd.

THE Prize will be awarded to the entrant of a machine which first covers a distance of 50 miles, measured in a straight line, in one uninterrupted flight, under the following conditions:—

### SUPPLEMENTARY REGULATIONS

**Date.**—The Competition will be open for a period of one year from 1st January to 31st December, 1923, inclusive.

**Organisation.**—The Competition will be conducted by the Royal Aero Club.

**Competitors.**—The Entrant and Pilot must be British subjects.

**Machines.**—The Competition is open to any heavier-than-air machine, constructed in the British Isles, not provided with any motive power except that produced by the personal exertions of the occupants during flight, and which is not supported either wholly or in part by any gas which is lighter than air.

**Entries.**—The entry fee is £5. This fee, together with entry form, must be received at the Royal Aero Club, 3, Clifford Street, London, W. 1, at least seven clear days before any flight is made in the Competition.

**Official Observers.**—The Royal Aero Club will appoint Official Observers to control all starts in the Competition. The expenses, if any, of the Observer must be borne by the Competitor, but in order to minimise such expenses, the Club will, as far as practicable, appoint an Observer resident in or near the locality selected.

**Starting Place.**—The Competitor may select his own starting place in the British Isles. A map, marking the approximate starting place and course to be followed, must be received by the Royal Aero Club seven clear days before the first attempt is made. At the expiry of the seven days no further notice is required, and the Competitor is at liberty to start at any time from this point, always provided the



Observer appointed by the Club is present. The Competitor is responsible for the Observer being notified beforehand of any attempts, and for his being present at the start.

All flights must be commenced between 6 a.m. and 6 p.m. (Official time.)

**Log.**—The Royal Aero Club will issue log sheets which must be carried by the Pilot in all flights in the Competition. The Observer will fill up the Starting Certificate on the Log Sheet and hand same to the Pilot prior to the start of any flight in the Competition. This Certificate will contain such particulars as will enable the Club to locate the exact point at which the start was made.

The Pilot, on landing, must fill up the Landing Certificate on the Log Sheet. This Certificate must contain such

particulars as will enable the Club to locate the exact point at which the landing was made. The Landing Certificate must be signed as correct by the Pilot and two responsible persons present at the time of landing, or, if none present, resident in the district where the landing was made.

The Log Sheet must be posted to the Royal Aero Club not more than 48 hours after the landing has taken place.

In the event of the Prize not being won, Messrs. Selfridge and Co., Ltd., will present Five Hundred Guineas to the Entrant of the machine which covers the longest distance, of not less than 25 miles, measured in a straight line, in one uninterrupted flight during the year.

## THE LONDON-CONTINENTAL SERVICES

FLIGHTS BETWEEN NOVEMBER 26 AND DECEMBER 2, INCLUSIVE

Route (including certain diverted journeys)	No. of flights*	No. of passengers	No. of flights carrying		No. of journeys completed†	Average flying time	Fastest time made by	Type and (in brackets) Number of each type flying
			Mails	Goods				
Croydon-Paris ...	15	58	5	12	10	2 35	H.P.W.8BG-EBBH (2h. 0m.)	B. (1), G. (7), H.P.W.8B (3).
Paris-Croydon ...	13	37	1	11	7	3 30	H.P.W.8BG-EBBH (2h. 59m.)	G. (9), H.P.W.8B. (3).
Croydon-Brussels-Cologne	3	6	3	—	3	3 55	D.H. 18 G-EAWW (3h. 37m.)	D.H. 18 (1), D.H. 34 (2).
Cologne-Brussels-Croydon	3	8	3	—	3	5 26	D.H. 18 G-EAWW (4h. 34m.)	D.H. 18 (1), D.H. 34 (2).
Croydon-Rotterdam ...	7	10	6	6	7	2 8	Fokker H-NABR (2h. 4m.)	F. (6).
Rotterdam-Croydon ...	6	5	5	5	6	3 4	Fokker H-NABJ (2h. 44m.)	F. (5).
Manchester-Croydon-Amsterdam	5‡	15	—	1	5	5 22	D.H. 34 G-EBBQ (4h. 52m.)	D.H. 34 (3).
Amsterdam-Croydon-Manchester	8§	9	5	—	8	—	—	D.H. 34 (3).
Total for week ...	60	148	28	35	49			

\* Not including "private" flights.

† Including certain journeys when stops were made *en route*.

‡ Man.-Croy. 1, Croy.-A'dam. 2.

§ A'dam.-Croy. 4, Croy.-Man. 4.

Av. = Avro. B = Breguet. Br. = Bristol. Bt. = B.A.T. D.H.4 = De Havilland 4, D.H.9 (etc.).  
F. = Fokker. Fa. = Farman F.50. G. = Goliath Farman. H.P. = Handley Page. M. = Martinsyde. Sp. = Spad.  
Vi. = Vickers Vimy. Vu. = Vickers Vulcan. W. = Westland.

The following is a list of firms running services between London and Paris, Brussels, etc., etc.:—Co. des Grandes Expresses Aériennes; Daimler Hire, Ltd.; Handley Page Transport, Ltd.; Instone Air Line; Koninklijke Luchtvaart Maatschappij; Messageries Aériennes.

**Incidental Flying.**—Mr. Perry and Capt. Stoken testing Avros, Bristol Fighter, D.H. 9a and Sopwith Snipes at Croydon for the Aircraft Disposal Co. Capt. Stoken flew the Bristol to Brussels on the 1st.

## CAMBRIDGE UNIVERSITY AERONAUTICAL SOCIETY

UNDER the patronage of H.R.H. the Duke of York, the Cambridge University Aeronautical Society has had a most interesting series of papers read during the Michaelmas Term.

The President of the C.U.Ae.S. for 1922-23 is Flt.-Lieut. W. W. Wakefield, R.A.F., Pembroke, and the Hon. Sec. is J. A. L. Denison, of Trinity College.

On October 25 Mr. Granville Bradshaw read a paper entitled "Oil Cooling." Flt.-Lieut. W. R. Acland, on November 1, read a paper on "Deck Flying," and on November 8 Lieut.-Col. W. A. Bristow gave a lecture on "Commercial Aviation."

Mr. Fleming Williams, on November 15, told the Society all about "Gliders," while on November 22 Air Vice-Marshal P. W. Game read a most instructive paper on "Organisation." Finally (November 29) Group Capt. F. W. Bowhill, C.M.G., concluded the lectures of the term with a paper entitled "Royal Air Force Operations in Somaliland, 1919."

It will thus be seen that the C.U.Ae.S. has not lacked variety in its lectures, and has been fortunate in securing lecturers who were specialists in their subjects. It is hoped, if space permits, to publish some of the papers, in abbreviated form, in subsequent issues of FLIGHT.

### Irish Rebels Bombed from the Air

THE Irish Free State is at last finding its aeroplanes useful. After an ambush of National troops by 60 irregulars near Drimoleague (W. Cork) on Sunday last, a Free State aeroplane located the rebels and dropped bombs on them with, it is stated, considerable effect. The survivors took refuge in a wood, which was raked with machine-gun fire from the aeroplane, and further casualties resulted. This is the first time the Free State has made use of the aeroplane in this way, and no doubt they will profit by the experience. It seems to us that the aeroplane should help considerably in obtaining peace and order in Ireland.

### Experimental Data Without Wind Channel

WHAT should prove to be an extremely interesting paper is to be read before the Inst. of Aeronautical Engineers, by Mr. O. T. Gnosspeilus, A.C.G.I., A.F.R.Ae.S., at the Engineers' Club, Coventry Street, W. (6.30 p.m.), on Friday, the 15th inst. The title of the paper is "Experimental Data Without Wind Channel," and the lecturer is publishing for the first time his method of obtaining data on aerofoils, streamline bodies, etc., by simple means without the expense of wind channel or other laboratory apparatus. It is anticipated that the information contained in this paper will be of great value to all those interested in the design of aircraft.

# THE ROYAL AIR FORCE STAFF COLLEGE

"CONFERENCES rather than Cramming" is *not* the official motto of the Royal Air Force Staff College at Andover, but perhaps it expresses fairly well the spirit in which, under the guidance of its Commandant, Air-Commodore Brooke-Popham, the College is working during this, its first, year of existence. Opened on April 4, 1922, the R.A.F. Staff College marks, as Air-Marshal Sir Hugh Trenchard, Chief of the Air Staff, said in his opening address, "a signpost, and on the signpost are the words 'To Efficiency, Economy, and Foresight.'" The R.A.F. Staff College may be described as the cradle of the brains of the R.A.F., and to a very great extent the manner in which the R.A.F. of the future will develop depends upon the work done at Andover. The General Staff has recently been defined as "a system of co-ordinated functions, performed by persons working together, to a certain degree irrespective of rank, deriving their status from the fact that they are essential elements in the working of the whole." A Staff system is not peculiar to the Navy and Army; it is the method by which authority conveys its intentions to, or renders them practicable by, the Executive. "The General Staff," as Clausewitz says, "is intended to convert the ideas of the Commander into orders, not only by conveying them to the troops, but far more by working out all necessary matters of detail, thus relieving the General from a great amount of trouble."

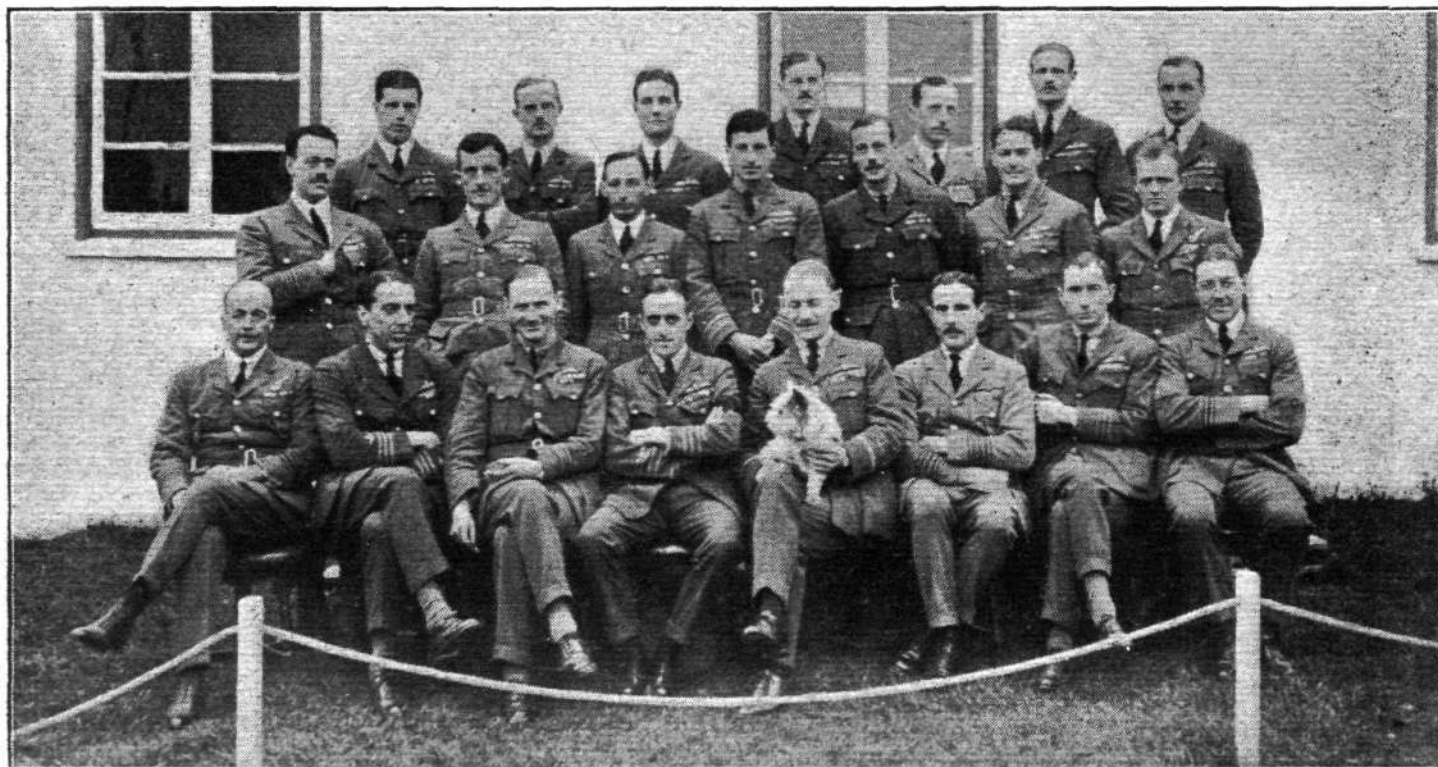
By the courtesy of the Air Ministry and of the Commandant of the Staff College, Air-Commodore Brooke-Popham, we had the privilege, last week, of paying a visit to the Andover establishment, which is next door to the headquarters of No. 7 Group, Inland Area. Here we were permitted to gain an insight into the general principles upon which the Staff College is conducted, and were present, for some considerable time, at a conference between students, instructors, and one representative of the directing staff. The subject that was being discussed at this conference was the new Operations Manual, and it provided an excellent illustration of the very great advantage which the policy of "conferences rather than cramming" gives. In a case like this, the procedure is for the students to be divided into groups, usually three, who discuss among themselves a certain section of the Manual. Having thoroughly sifted the matter contained, and discussed every sentence, amendments or amplifications are

suggested by each group, and during the conference which follows two representatives from each group meet in the library, where they place their views before instructors. Usually a member of the Directing Staff is present, but does not usually take part in the discussion. The section of the Manual under discussion is then gone through, sentence by sentence and paragraph by paragraph. Certain amendments are accepted, subject always to the later approval of the Directing Staff, and the minutes of the conference entered in a special book. After the conference this book is handed to the Directing Staff, who enter in it their own views on each amendment, either disagreement or concurrence, and finally the book is to be sent to the Air Ministry, where the ultimate decision is made by the Chief of the Air Staff.

It will be seen that the procedure is necessarily a slow one, but, on the other hand, the Air Ministry has, in this manner, the benefit of the accumulated experience of the officers, all of whom, students as well as instructors, have seen active service in various theatres of war. Thus there is real and immediate practical advantage in this system of conferences, in addition to their value in teaching the students to express themselves clearly and concisely.

The Directing Staff of the R.A.F. College is composed as follows: Air-Commodore H. R. M. Brooke-Popham, C.B., C.M.G., D.S.O., A.F.C. (Commandant); Air-Commodore R. H. Clark Hall, C.M.G., D.S.O., L. of H.; Group Captain P. B. Joubert de la Ferte, C.M.G., D.S.O.; Wing Commander W. R. Freeman, D.S.O., M.C., L. of H.; Wing Commander C. H. K. Edmonds, D.S.O., O.B.E.; Squadron-Leader B. E. Sutton, D.S.O., O.B.E., M.C., B.C. de G.; Flight-Lieut. Adjutant C. B. Dick-Cleland. Of these officers four have previously served with the Army, and two with the Navy. Each year twenty students are admitted to the Staff College, and the course lasts for twelve months.

During the present year the list of students is as follows: Wing Commanders: J. E. A. Baldwin, D.S.O., O.B.E.; R. E. C. Peirse, D.S.O., A.F.C. Squadron Leaders: B. F. Smythies, D.F.C., W. S. Douglas, M.C., D.F.C., C. W. Pulford, O.B.E., A.F.C., K. R. Park, M.C., D.F.C., W. A. McClaughry, D.S.O., M.C., D.F.C., C. F. A. Portal, D.S.O., M.C., L. L. MacLean, H. S. Powell, M.C., E. B. Beauman. Flight-



R.A.F. STAFF COLLEGE, ANDOVER: Group of Directing Staff, Instructors and Students. Top row, left to right: Flight-Lieut. N. W. Wadham; Flight-Lieut. J. B. Cole-Hamilton; Flight-Lieut. W. B. Farrington, D.S.O.; Flight-Lieut. G. M. Lawson, M.C.; Flight-Lieut. H. S. Kerby, D.S.O., A.F.C.; Squadron-Ldr. K. R. Park, M.C., D.F.C.; Flight-Lieut. W. R. D. Acland, D.F.C., A.F.C. Middle row, left to right: Squadron-Ldr. H. S. Powell, M.C.; Squadron-Ldr. C. W. H. Pulford, O.B.E., A.F.C.; Squadron-Ldr. E. B. Beauman; Squadron-Ldr. C. F. A. Portal, D.S.O., M.C.; Squadron-Ldr. L. L. MacLean; Flight-Lieut. R. M. Drummond, D.S.O., O.B.E., M.C.; Flight-Lieut. E. B. C. Betts, D.S.O., D.F.C. Bottom row, left to right: Flight-Lieut. C. B. Dick-Cleland (Adjutant); Wing-Commndr. R. E. C. Peirse, D.S.O., A.F.C.; Squadron-Ldr. B. E. Sutton, D.S.O., O.B.E., M.C. (Directing Staff); Wing-Commndr. C. H. K. Edmonds, D.S.O., O.B.E. (Directing Staff); Air-Commodore H. R. M. Brooke-Popham, C.B., C.M.G., D.S.O., A.F.C. (Commandant); Group-Capt. P. B. Joubert de la Ferte, C.M.G., D.S.O. (Directing Staff); Wing-Commndr. W. R. Freeman, D.S.O., M.C. (Directing Staff); Flight-Lieut. C. H. Hayward.



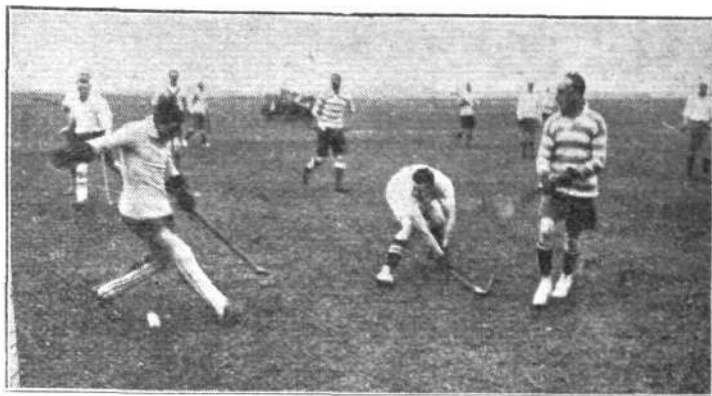
Lieuts: W. R. D. Acland, D.F.C., A.F.C., G. M. Lawson, M.C., R. M. Drummond, M.C., N. W. Wadham, C. H. Hayward, H. S. Kerby, D.S.C., A.F.C., J. B. Cole-Hamilton, E. B. C. Betts, D.S.C., D.F.C., W. B. Farrington, D.S.O.

Nine of the students have served previously with the Army, four with the Navy, and three with the Australian or New Zealand Army. Later it is hoped to introduce a system of interchanging officers between the R.A.F. Staff College and the Army and Navy Staff Colleges, while next year's course, which begins on April 1, 1923, will be attended by representatives of the Canadian and Australian Air Services. At present two R.A.F. officers are undergoing courses at the Naval Staff College at Greenwich, and two at the Army Staff College at Camberley. As soon as sufficient experience has been gained at Andover—and in this connection it should be realised that whereas the Army and Navy have had generations of gradual development, air war is less than ten years old—it is intended that every year two officers from the Army and two from the Navy should attend the R.A.F. Staff College.

The course of study at the R.A.F. Staff College is at present devised with two objects in view: firstly, to train officers in staff duties whether in peace or war; secondly, to afford a general education which will serve as a sound foundation for the building up of a school of thought in the R.A.F. It aims at developing the habit of steady reading and thinking rather than at the acquisition of a mass of detail. The many and varied experiences of air-fighting during the last war have given rise to a diversity of theory and practice. Service regulations must therefore for some time be tentative and provisional, and must be tested out continuously by exercises and discussion. A knowledge of broad principles and a wide outlook will prevent these exercises and discussions from resulting in the formation of narrow and dogmatic conclusions.

Space does not permit of going into any great detail regarding the course of instruction, but the following brief summary may give some idea of the nature of the subjects studied:—The nature of war and its fundamental principles; inter-relationships of policy, strategy and tactics; the development of scientific warfare; employment of aircraft in war; naval strategy; naval tactics; land strategy; land tactics; combined operations; Air Force organisation; Naval organisation; Army organisation; supply and lines of communications; transportation; staff duties; intelligence and secret service; imperial defence; British foreign policy before 1914; the peace settlements in Europe and the East; the Washington Conference and its effect on naval armaments; the relations between war and industry; organisation, administration and distribution of the Japanese, French and American Air Forces; technical progress in aircraft and their equipment. Each of these subjects is divided into a number of subdivisions, so that it will be seen that there is a great deal to be studied and digested.

Apart from the course outlined above, conferences are, as already mentioned, held at frequent intervals, while lectures by "outside" experts are given whenever possible, and these are so chosen as to give students an opportunity of learning something about matters which would not ordinarily come within their sphere. Thus, to give an idea of the extraordinarily varied subjects which are dealt with in these lectures, we mention two that were given recently. Lord Hugh Cecil



**KEEPING FIT: R.A.F. Staff College hockey team playing match against 17th Lancers.**

gave a lecture on the League of Nations, and Mr. Bramley one on Trade Unions. It was explained that in the course of their duties officers of the R.A.F. would naturally come into contact with aircraft manufacturers, and that unless they knew something about trade unions they could not fully appreciate the position of manufacturers. With such a policy in force there is, it will be realised, little danger of the Royal Air Force Staff getting into a narrow groove, out of which afterwards it would be difficult to break away.

In this matter of policy, of forming a school of thought, the R.A.F. Staff College is at an advantage compared with the corresponding institutions of the older services, which grew up gradually, and thus had not, it is to be feared, the same opportunity of broadening their outlook. As the Staff College has only just come into being, it is not hampered by precedent, and those responsible for its foundation have a glorious opportunity—an opportunity that will never occur again—of creating an institution worthy of the Service it represents. Let it be said at once that those in charge, no less than the officers attending as students, fully realise not only their opportunity but also their responsibilities. From the Commandant down to the youngest student, all are giving the very best of which they are capable, and all are working together in that spirit of being, largely irrespective of rank, "essential elements in the working of the whole," which is so necessary if success is to be attained.

As regards the establishment itself, little need be said. It resembles others of this type, and is noteworthy for its lack of pretentiousness. Yet the spirit which pervades the establishment is such that one comes away with a feeling that here if anywhere calm thinking and considered judgment are the keynotes. Not that the lighter side is neglected. Far from it. On the day of our visit a hockey match was being played between a College team and an Army team (17th Lancers). When we left, the match stood at 2 all.

Sports of all sorts are encouraged in order to keep students as well as instructors and Directing Staff fit, and several aeroplanes are maintained at the establishment so that officers may "keep their hands in" by occasional flying.

# THE ROYAL AIR FORCE

London Gazette, November 28, 1922

## General Duties Branch

The follg. are granted permanent comms. as Flying Offrs., retaining their present seny. *Gazettes* of the dates indicated, appointing these offrs. to short service comms., are cancelled:—S. M. Park Sept. 12, 1919. C. D. Adams; Sept. 16, 1919. S. McKeever; Nov. 28, 1919. The follg. are granted permanent comms. as Flying Offrs. (since promoted). *Gazettes* of dates indicated in brackets, appointing these offrs. to short service comms., are cancelled:—F. P. Adams; Dec. 5, 1919 (Dec. 5, 1919). S. F. Vincent, A.F.C.; Oct. 19, 1920 (Oct. 26, 1920).

The follg. are granted short service comms. as Pilot Offrs. on probation, with effect from, and seny. of, Nov. 13:—R. E. Bain, K. K. Brown, C. H. S. Buckmaster, C. W. A. Byrne, D. L. Dawson, M. Fraser, A. H. Grace, A. E. St. G. Gratte, A. S. Hutton, E. V. H. Jarvis, L. M. T. Marescaux, H. P. Morris, G. H. Rawlinson, H. J. Storey, N. H. F. Unwin.

## ROYAL AIR FORCE INTELLIGENCE

**No. 56 Squadron moved from Egypt.**—No. 56 Squadron, Royal Air Force, ceased to exist in Egypt, with effect from midnight, September 23, 1922; headquarters and two flights were re-formed on November 1, 1922, at Hawkinge.

The third (detached) flight of No. 56 Squadron, now serving with the Constantinople Wing, will rejoin the squadron at Hawkinge on withdrawal from the Constantinople area.

The follg. are granted temp. comms. in the ranks stated on seconding for four years' duty with R.A.F. (Nov. 20):—

*Flying Offr. (Hon. Flt. Lt.).*—K. M. Murray (Capt., Prince of Wales' Vols.). *Flying Offr.*—E. V. H. Hudson (Lieut., Middx. R.); Lieut.-Col. L. F. Blandy, D.S.O., R.E., is granted temp. commn. as Group Capt., with effect from Nov. 30, and seny. Jan. 1, 1919; Pilot Offr. H. V. Alder is confirmed in rank; June 30. The follg. Pilot Offrs. to be Flying Offrs.:—A. E. Rogenhagen; Oct. 15. W. J. Gayes, D. J. Hughes-Jones, E. A. Slater, K. R. Thomas; Oct. 28.

*Flying Offr. D. P. Cameron, M.B.E.,* is transfd. to Res., Class A; Nov. 28. Sqdn. Leader M. G. B. Copeman is placed on ret. list on account of ill-health contracted in the Service, and is granted rank of Lieut.-Col.; Nov. 29. *Flight Lieut. W. J. de Salis, D.S.C.,* resigns his perm. commn., and is permitted to retain rank of Capt.; Nov. 22. *Flying Offr. M. R. Cooper-Driver (Lieut., Devon R.)* relinquishes his temp. commn. on resigning his commn. in Army; Nov. 25.

**No. 3 Squadron moved to Gosport.**—No. 3 Squadron, Royal Air Force, moved on November 8, 1922, from Leuchars to Gosport.

**Relinquishment of R.A.F. Station.**—The land and buildings comprising the Airship Station at Inchinnan were handed over on October 12, 1922, to the Disposal and Liquidation Commission for disposal.

## IN PARLIAMENT

### Imperial Airship Service

SIR NEWTON MOORE, on November 30, asked the Prime Minister whether he can inform the House of the result of the investigation on the proposed Imperial airship service by the Committee presided over by the First Lord of the Admiralty; if the result of this investigation is satisfactory, will he indicate the intentions of the Government at an early date in view of the urgency of improving Empire communication?

The Prime Minister: The report of this investigation is now before the Government, which is, however, not yet in a position to announce its decision.

Captain Viscount Curzon: Would not an airship service give employment to a certain number of people, and could it not be considered in relation to the Government proposals for the relief of unemployment?

The Prime Minister: The question will be considered as soon as we possibly can. That is all I can say.

Mr. Wells: Will the right hon. gentleman consider the position at Bedford affecting the employment of 1,500 men—where unemployment is rife, in connection with the airship scheme?

Mr. Speaker: Perhaps the hon. member will put that question down.

### Royal Air Force Depot, Harlescott.

MAJOR VISCOUNT SANDON asked the Secretary of State for Air what is the policy of His Majesty's Government as to the vacant buildings in possession of the Royal Air Force depot at Harlescott, Salop; when they and the land they stand on are to be released for other uses; and for what purpose they have been retained hitherto?

Lieut.-Colonel Sir Samuel Hoare: The depot at Harlescott is one of the Air stations which it is intended to retain as part of the permanent organisation of the Royal Air Force. The building accommodation and lands now included within this station are not surplus to requirements, and I therefore regret that they cannot be released for other purposes.

### Royal Air Force Expansion

CAPT. TERRELL on December 4 asked the Secretary of State for Air how many new squadrons have been formed since the ex-Prime Minister's announcement in August; whether any additional number of airmen have been called into being; and what steps have been taken to relieve airmen recently employed in trying climates such as Iraq?

Sir S. Hoare: As regards the first and second parts of the question, I would ask my hon. friend to put down this question again in about a week's time, when I hope to be in a position to deal fully with all questions concerned with the proposed expansion of the Royal Air Force, as outlined in the announcement made to the House by the ex-Prime Minister in August last. The answer to the third part of the question is that the normal period of service of airmen in Iraq is two years. The replacement of those who have completed their period is proceeding normally, except that some delay has occurred on account of the late Near East crisis.

### New Aeroplanes

MR. ALFRED T. DAVIES asked how many additional or up-to-date aeroplanes have been added to the home and foreign forces over which the Ministry has control since April 1 last; and what number are now under construction?

Sir S. Hoare: Since April 1 the Air Ministry has taken delivery of 21 new aeroplanes for service and experimental purposes; a further 132 are under construction. In addition, a large number of machines has been reconditioned.

### R.A.F. Recruiting

MR. MCENTEE asked whether civilian recruiters are employed by the Royal Air Force in different centres; whether he is aware that men desirous of entering the force have to come to London and return home, have afterwards to go to Uxbridge and return home, and then, if passed, have to report once more; and whether, in view of the unnecessary expense involved in so much travelling, arrangements can be made for recruits in the various centres being examined on the spot?

Sir S. Hoare: The answer to the first part of the question is that the employment of civilian recruiters, whether in London or elsewhere, ceased as from the 1st instant, for reasons of economy; to the second, that persons wishing to enlist need not make a special journey to London, there being also recruiting facilities at every Royal Air Force station in the United Kingdom and at Glasgow and Birmingham, and that the subsequent journey to Uxbridge is only necessary for recruits who have to pass a trade test; to the last, that the cost of setting up trade test establishments at local centres would be more expensive than the cost of taking the recruits to Uxbridge, which cost, I should add, is in all normal cases borne by public funds, and does not fall on the recruit.

### Air Force

SIR C. YATE asked the Under-Secretary of State for India when Sir John Salmond's Report on the Air Force in India will be published?

Earl Winterton: The Report deals with defence questions, and in view of the important strategic considerations involved it would not be in the public interest to publish it.

### Vickers, Ltd., Extend Their Activities

ON November 21, in the High Court of Justice, Chancery Division, Mr. Justice Lawrence heard the petition of Messrs. Vickers, Ltd., to extend the objects of the Company in accordance with a special resolution passed at extraordinary general meetings held on July 19 and August 3 last. This petition referred to extended powers in utilising the buildings and plant which the company had acquired during the War. There being no opposition, Mr. Justice Lawrence granted the petition. The additional powers conferred upon the company include the holding of interest in coal and iron mines, brickworks, quarries, etc.; the manufacture, etc., of locomotives, tractors, motor-cars, aircraft and other vehicles; dealing in explosives and the manufacture of all classes of optical and scientific apparatus; the construction of aircraft for commercial purposes, and of tramways, railways, roadways, bridges, tunnels, canals, hydraulic, electric and gas works, smelting works, refineries, kilns, cement works, quarries, garages and aerodromes; the manufacture of by-products of the company's various industries and other chemical and natural products; the granting of pensions, etc., to any employees and the establishment of institutions for their benefit; the carrying out of research work. The already extensive activities of this go-ahead firm will thus very considerably be increased.

## SOCIETY OF MODEL AERONAUTICAL ENGINEERS (London Aero-Models Association)

ON Sunday last members turned up in strong force on Parliament Hill. The weather conditions were very favourable both for flying and gliding, and were taken advantage of by all present, Messrs. Pilcher, Whelpton and Woolley having excellent sport flying their enclosed-fuselage models and putting up excellent performances. Mr. W. E. Evans had a new glider with double-surfaced wings, which shows great promise. Mr. F. de P. Green also had a new glider, which no doubt after a few slight alterations will put up a good attempt for the glider record. Messrs. Burchell, Davies, Howes, Johnson, Rippon and others were very busy with gliders and model aeroplanes. Messrs. Howse and Rippon put in a great deal of time experimenting with launching models on special towing lines.

On Sunday next many members will make an attempt on the glider record at Parliament Hill. Judges will be at the starting-point at 11 a.m. prompt.

On Sunday, December 17, members will congregate at Wimbledon Common, near the Windmill, for the specific purpose of trying to improve the British records of model aeroplanes. The Society having now been officially recognised by the Royal Aero Club as the body governing model aeroplane competitions, no doubt greater efforts will be made by all model aeroplane enthusiasts throughout Great Britain. The Competition Secretary, Mr. C. A. Rippon, 52, Fairbridge Road, Holloway, London, N. 19, will be pleased to get into communication with prospective competitors.

It is hoped to have the 1923 Programme of Competitions ready early in the new year.

On December 15, at Headquarters, Mr. W. E. Evans will give a lecture on "Some Points on Wood." All interested in the subject are invited to attend.

Meetings are held at Headquarters, the "Red Lion Hotel," 20, Great Windmill Street Piccadilly, W. 1, every Friday at 7.30 p.m. Full particulars of the Society may be obtained from A. E. Jones, Hon. Sec., 48, Narcissus Road, West Hampstead, N.W. 6.

### The Newell (Parachutist) Relief Fund

THE first list of contributions collected by Messrs. E. R. Calthrop's Aerial Patents, Ltd., for the above fund, amounting to £30, has been forwarded today to the Rev. Prebendary F. W. Joyce, Vicar of Harrow. Further contributions for the benefit of the widow and children are earnestly solicited.

### Mullion R.N. Airships

THE Reunion Dinner will be held in January next. It is requested that changes of address and new members be notified to W. G. Lavender, Hon. Sec., 16, Alma Road, Wandsworth, S.W. 18.

## AERONAUTICAL PATENT SPECIFICATIONS

Abbreviations: cyl. = cylinder; I.C. = internal combustion; m. = motor. The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

### APPLIED FOR IN 1921

Published December 7, 1922

15,604.	W. L. PEET.	Clinometer. (188,352.)
18,219.	A. L. DAVIS.	Aircraft lamps. (188,357.)
21,024.	SIR J. B. HENDERSON.	Gyro-navigational apparatus. (188,390.)
28,032.	V. M. L. EXPERIMENTAL, LTD. and O. D. LUCAS.	Parachutes. (188,506.)
29,300.	W. E. APPELBY.	Framework construction. (188,523.)
33,934.	H. JUNKERS.	Fuel-injection devices for I.C. engines. (174,050.)

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